

CLAIMS

We claim:

1. A flame retardant polyester composition for calendering, comprising:
  - (a) a polyester having a crystallization half time from a molten state of at least 5 minutes wherein said polyester is a random copolymer;
  - (b) a plasticizer;
  - (c) a phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer; and
  - (d) an additive effective to prevent sticking of the polyester to calendering rolls.
2. The polyester composition of claim 1 wherein said plasticizer comprises one or more aromatic rings.
3. The polyester composition of claim 2 wherein said plasticizer comprises about 10 to about 40 weight percent (wt%) of said polyester composition based on the total weight of said polyester composition.
4. The polyester composition of claim 3 wherein said plasticizer dissolves a 5-mil (.127 mm) thick film of said polyester to produce a clear solution at a temperature of 160°C or less.
5. The polyester composition of claim 4 wherein said plasticizer has a solubility parameter in the range of about 9.5 to about 13.0 cal<sup>0.5</sup>cm<sup>-1.5</sup>.
6. The polyester composition of 5 wherein said plasticizer is an ester comprising
  - (i) an acid residue comprising one or more of: phthalic acid, adipic acid, trimellitic acid, benzoic acid, azelaic acid, terephthalic acid, isophthalic acid, butyric acid, glutaric acid, citric acid or phosphoric acid; and

- (ii) an alcohol residue comprising one or more aliphatic, cycloaliphatic, or aromatic alcohols containing up to about 20 carbon atoms.
- 7. The polyester composition of claim 6 wherein said alcohol residue of the plasticizer is methanol, ethanol, propanol, isopropanol, butanol, isobutanol, stearyl alcohol, lauryl alcohol, phenol, benzyl alcohol, hydroquinone, catechol, resorcinol, ethylene glycol, neopentyl glycol, 1,4-cyclohexanedimethanol, or diethylene glycol.
- 8. The polyester composition of claim 7 wherein said crystallization half time of the polyester is at least 12 minutes.
- 9. The polyester composition of claim 8 wherein said crystallization half time is at least 300 minutes.
- 10. The polyester composition of claim 9 wherein said polyester comprises (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent of one or more diols containing 2 to about 20 carbon atoms, wherein said diacid residues are based on 100 mole percent and the diol residues are based on 100 mole percent.
- 11. The polyester composition of claim 10 wherein said diol residues comprise one or more diols selected from ethylene glycol, 1,2-propanediol, 1,3-propanediol, propylene glycol, 1,4-butanediol, 1,5-pentanediol, neopentyl glycol, diethylene glycol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pentanediol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, 1,3-cyclohexanedimethanol, bisphenol A, and polyalkylene glycol.

12. The polyester composition of claim 11 wherein said diol residues comprise about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent ethylene glycol.
13. The polyester composition of claim 12 wherein said diacid residues further comprise 0 to about 20 mole percent of one or more modifying diacids containing about 4 to about 40 carbon atoms.
14. The polyester composition of claim 13 wherein said modifying diacid comprises one or more of: succinic acid, glutaric acid, adipic acid, suberic acid, sebacic acid, azelaic acid, dimer acid, or sulfoisophthalic acid.
15. The polyester composition of claim 14 wherein said plasticizer comprises one or more benzoates, phthalates, phosphates, or isophthalates.
16. The polyester composition of claim 15 wherein said plasticizer comprises diethylene glycol dibenzoate.
17. The polyester composition of claim 16 wherein said flame retardant comprises about 5 to about 40 wt%, based on the total weight of said polyester composition, of one or more monoesters, diesters, or triesters of phosphoric acid.
18. The polyester composition of claim 17 wherein said flame retardant is a plasticizer for said polyester.
19. The polyester composition of claim 18 wherein said flame retardant comprises resorcinol bis(diphenyl phosphate).
20. The polyester composition of claim 19 wherein said polyester composition has a Tg of 30°C or less.

21. The polyester composition of claim 20 wherein said polyester composition has a Tg of 20°C or less.
22. A flame retardant polyester composition for calendering, comprising:
  - (a) a polyester having a crystallization half time from a molten state of at least 10 minutes wherein said polyester is a random copolymer comprising (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 20 to about 40 mole percent 1,4-cyclohexanedimethanol and about 60 to about 80 mole percent of one or more diols containing 2 to about 20 carbon atoms, wherein said diacid residues are based on 100 mole percent and the diol residues are based on 100 mole percent;
  - (b) about 10 wt% to about 40 wt% of plasticizer comprising one or more benzoates, phthalates, phosphates, or isophthalates;
  - (c) about 5 wt% to about 40 wt% of a phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer; and
  - (d) an additive effective to prevent sticking of the polyester to calendering rolls, wherein said wt% is based upon the total weight of said polyester composition.
23. The polyester composition of claim 22 wherein said additive comprises about 0.1 wt% to about 10 wt%, based on the total weight of the polyester composition, of one or more fatty acid amides, metal salts of organic acids, fatty acids, fatty acid salts, fatty acid esters, hydrocarbon waxes, ester waxes, phosphoric acid esters, chemically modified polyolefin waxes; glycerin esters, talc, or acrylic copolymers.
24. The polyester composition of claim 23 wherein said additive comprises erucylamide, stearamide, calcium stearate, zinc stearate, stearic acid, oleic acid, palmitic acid, paraffin wax, polyethylene waxes, polypropylene waxes, carnauba wax, glycerol monostearate, and glycerol distearate.

25. The polyester composition of claim 24 further comprising (e) an oxidative stabilizer.
26. The polyester resin composition of claim 25 further comprising (f) a melt strength enhancer.
27. The polyester composition of claim 23 wherein said additive comprises (i) a fatty acid or a salt of a fatty acid containing more than 18 carbon atoms and (ii) an ester wax comprising a fatty acid residue containing more than 18 carbon atoms with an alcohol residue containing from 2 to 28 carbon atoms, wherein the ratio of said fatty acid or said salt of a fatty acid to said ester wax is 1:1 or greater.
28. The polyester composition of claim 27 wherein said additive is present from about 0.1 to about 2 weight percent.
29. The polyester composition of claim 28 wherein said fatty acid comprises montanic acid; said salt of a fatty acid comprises one or more of: the sodium salt of montanic acid, the calcium salt of montanic acid, or the lithium salt of montanic acid; and said fatty acid residue of said ester wax comprises montanic acid.
30. The polyester composition of claim 29 wherein said alcohol residue of said ester wax comprises one or more of: montanyl alcohol, ethylene glycol, butylene glycol, glycerol or pentaerythritol.
31. The polyester composition of claim 30 wherein said ester wax has been partially saponified with calcium hydroxide.
32. The polyester composition of claim 31 wherein the ratio of said fatty acid or said salt of a fatty acid to said ester wax is 2:1 or greater.

33. A process for a flame retardant film or a sheet, comprising: calendering a polyester composition comprising
  - (a) a polyester having a crystallization half time from a molten state of at least 5 minutes, wherein said polyester is a random copolymer;
  - (b) a plasticizer;
  - (c) a phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer; and
  - (d) an additive effective to prevent sticking of the polyester to calendering rolls.
34. The process of claim 33 wherein said plasticizer comprises one or more aromatic rings.
35. The process of claim 34 wherein said plasticizer comprises about 10 to about 40 wt% of said polyester composition based on the total weight of said polyester composition.
36. The process of claim 35 wherein said plasticizer dissolves a 5-mil (.127 mm) thick film of said polyester to produce a clear solution at a temperature of 160°C or less.
37. The process of claim 36 wherein said plasticizer has a solubility parameter in the range of about 9.5 to about 13.0  $\text{cal}^{0.5} \text{cm}^{-1.5}$ .
38. The process of 37 wherein said plasticizer is an ester comprising
  - (i) an acid residue comprising one or more of: phthalic acid, adipic acid, trimellitic acid, benzoic acid, azelaic acid, terephthalic acid, isophthalic acid, butyric acid, glutaric acid, citric acid or phosphoric acid; and
  - (ii) an alcohol residue comprising one or more of: methanol, ethanol, propanol, isopropanol, butanol, isobutanol, stearyl alcohol, lauryl alcohol, phenol, benzyl alcohol, hydroquinone, catechol, resorcinol, ethylene glycol, neopentyl glycol, 1,4-cyclohexanedimethanol, or diethylene glycol.

39. The process of claim 38 wherein said polyester composition comprises a molten, pellet or powder form and is passed through a compressive nip between at least two calendering rolls at temperatures of about 100°C to about 200°C.
40. The process of claim 39 wherein said polyester has a crystallization half time of at least 300 minutes.
41. The process of claim 40 wherein said polyester comprises (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent of one or more diols selected from ethylene glycol, 1,2-propanediol, 1,3-propanediol, propylene glycol, 1,4-butanediol, 1,5-pentanediol, neopentyl glycol, diethylene glycol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pantanediol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, 1,3-cyclohexanedimethanol, bisphenol A, and polyalkylene glycol, wherein said diacid residues are based on 100 mole percent and said diol residues are based on 100 mole percent.
42. The process of claim 41 wherein said diol residues comprise about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent ethylene glycol.
43. The polyester composition of claim 42 wherein said plasticizer comprises one or more benzoates, phthalates, phosphates, or isophthalates.
44. The polyester composition of claim 43 wherein said plasticizer comprises diethylene glycol dibenzoate.
45. The process of claim 44 wherein said flame retardant comprises about 5 to about 40 wt%, based on the total weight of said polyester composition, of one or more monoesters, diesters, or triesters of phosphoric acid.

46. The process of claim 45 wherein said flame retardant is a plasticizer for said polyester.
47. The process of claim 46 wherein said flame retardant comprises resorcinol bis(diphenyl phosphate).
48. The process of claim 47 wherein said polyester composition has a Tg of 30°C or less.
49. The process of claim 48 wherein said additive comprises about 0.1 wt% to about 10 wt%, based on the total weight of the polyester composition, of one or more fatty acid amides, metal salts of organic acids, fatty acids, fatty acid salts, fatty acid esters, hydrocarbon waxes, ester waxes, phosphoric acid esters, chemically modified polyolefin waxes; glycerin esters, talc, or acrylic copolymers.
50. The process of claim 49 wherein said additive comprises (i) a fatty acid or a salt of a fatty acid containing more than 18 carbon atoms and (ii) an ester wax comprising a fatty acid residue containing more than 18 carbon atoms and an alcohol residue containing from 2 to 28 carbon atoms, wherein the ratio of said fatty acid or said salt of a fatty acid to said ester wax is 1:1 or greater.
51. The process of claim 50 wherein said fatty acid comprises montanic acid; said salt of a fatty acid comprises one or more of: the sodium salt of montanic acid, the calcium salt of montanic acid, or the lithium salt of montanic acid; and said fatty acid residue of said ester wax comprises montanic acid.
52. A flame retardant film or sheet comprising a polyester composition, said polyester composition comprising
  - (a) a polyester having a crystallization half time from a molten state of at least 5 minutes, wherein said polyester is a random copolymer;
  - (b) a plasticizer;

- (c) an phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer; and
- (d) an additive effective to prevent sticking of the polyester to calendering rolls, wherein said film or sheet is prepared by calendering said polyester composition.

53. The film or sheet of claim 52 wherein said plasticizer comprises one or more aromatic rings.

54. The film or sheet of claim 53 wherein said plasticizer comprises about 10 to about 40 wt% of said polyester composition based on the total weight of said polyester composition.

55. The film or sheet of claim 54 wherein said plasticizer dissolves a 5-mil (.127 mm) thick film of said polyester to produce a clear solution at a temperature of 160°C or less.

56. The film or sheet of claim 55 wherein said plasticizer has a solubility parameter in the range of about 9.5 to about 13.0  $\text{cal}^{0.5}\text{cm}^{-1.5}$ .

57. The film or sheet of 56 wherein said plasticizer is an ester comprising

- (i) an acid residue comprising one or more of: phthalic acid, adipic acid, trimellitic acid, benzoic acid, azelaic acid, terephthalic acid, isophthalic acid, butyric acid, glutaric acid, citric acid or phosphoric acid; and
- (ii) an alcohol residue comprising one or more of: methanol, ethanol, propanol, isopropanol, butanol, isobutanol, stearyl alcohol, lauryl alcohol, phenol, benzyl alcohol, hydroquinone, catechol, resorcinol, ethylene glycol, neopentyl glycol, 1,4-cyclohexanedimethanol, or diethylene glycol.

58. The film or sheet of claim 57 wherein said polyester has a crystallization half time of at least 300 minutes.

59. The film or sheet of claim 58 wherein said polyester comprises (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent of one or more diols selected from ethylene glycol, 1,2-propanediol, 1,3-propanediol, propylene glycol, 1,4-butanediol, 1,5-pentanediol, neopentyl glycol, diethylene glycol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pantanediol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, 1,3-cyclohexanedimethanol, bisphenol A, and polyalkylene glycol, wherein said diacid residues are based on 100 mole percent and said diol residues are based on 100 mole percent.
60. The film or sheet of claim 59 wherein said diol residues comprise about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent ethylene glycol.
61. The polyester composition of claim 60 wherein said plasticizer comprises one or more benzoates, phthalates, phosphates, or isophthalates.
62. The polyester composition of claim 61 wherein said plasticizer comprises diethylene glycol dibenzoate.
63. The film or sheet of claim 62 wherein said flame retardant comprises about 5 to about 40 wt%, based on the total weight of said polyester composition, of one or more monoesters, diesters, or triesters of phosphoric acid.
64. The film or sheet of claim 63 wherein said flame retardant is a plasticizer for said polyester.
65. The film or sheet of claim 64 wherein said flame retardant comprises resorcinol bis(diphenyl phosphate).

66. The film or sheet of claim 65 wherein said polyester composition has a Tg of 30°C or less.
67. The film or sheet of claim 66 wherein said additive about 0.1 wt% to about 10 wt%, based on the total weight of the polyester composition, of one or more fatty acid amides, metal salts of organic acids, fatty acids, fatty acid salts, fatty acid esters, hydrocarbon waxes, ester waxes, phosphoric acid esters, chemically modified polyolefin waxes; glycerin esters, talc, or acrylic copolymers.
68. The film or sheet of claim 67 wherein said additive comprises (i) a fatty acid or a salt of a fatty acid containing more than 18 carbon atoms and (ii) an ester wax comprising a fatty acid residue containing more than 18 carbon atoms and an alcohol residue containing from 2 to 28 carbon atoms, wherein the ratio of said fatty acid or said salt of a fatty acid to said ester wax is 1:1 or greater.
69. The film or sheet of claim 68 wherein said fatty acid comprises montanic acid; said salt of a fatty acid comprises one or more of: the sodium salt of montanic acid, the calcium salt of montanic acid, or the lithium salt of montanic acid; and said fatty acid residue of said ester wax comprises montanic acid.
70. A flame retardant polyester composition for calendering, comprising:
  - (a) about 50 to about 95 weight percent of a polyester having a melting temperature of less than 220°C and exhibiting more than 1 percent crystallinity after annealing for 2000 minutes at a temperature at which said polyester has a maximum crystallization rate, wherein said polyester is a random copolymer;
  - (b) about 5 to about 50 wt% of a plasticizer miscible with said polyester, based on the total weight of said polyester composition; and
  - (c) a phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer.

71. The polyester composition of claim 70 wherein said plasticizer comprises one or more aromatic rings.
72. The polyester composition of claim 71 further comprising (d) an additive effective to prevent sticking of the polyester to the calender rolls.
73. The polyester composition of claim 72 wherein said plasticizer comprises about 10 to about 40 wt% of said polyester composition based on the total weight of said polyester composition.
74. The polyester composition of claim 73 wherein said plasticizer dissolves a 5-mil (.127 mm) thick film of said polyester to produce a clear solution at a temperature of 160°C or less.
75. The polyester composition of claim 74 wherein said plasticizer has a solubility parameter in the range of about 9.5 to about  $13.0 \text{ cal}^{0.5} \text{ cm}^{-1.5}$ .
76. The polyester composition of 75 wherein said plasticizer is an ester comprising
  - (i) an acid residue comprising one or more of: phthalic acid, adipic acid, trimellitic acid, benzoic acid, azelaic acid, terephthalic acid, isophthalic acid, butyric acid, glutaric acid, citric acid or phosphoric acid; and
  - (ii) an alcohol residue comprising one or more of: methanol, ethanol, propanol, isopropanol, butanol, isobutanol, stearyl alcohol, lauryl alcohol, phenol, benzyl alcohol, hydroquinone, catechol, resorcinol, ethylene glycol, neopentyl glycol, 1,4-cyclohexanedimethanol, or diethylene glycol.
77. The polyester composition of claim 76 wherein said polyester comprises (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent of one or more diols selected from ethylene glycol, 1,2-propanediol, 1,3-propanediol, propylene

glycol, 1,4-butanediol, 1,5-pentanediol, neopentyl glycol, diethylene glycol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pentanediol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, 1,3-cyclohexanedimethanol, bisphenol A, and polyalkylene glycol, wherein said diacid residues are based on 100 mole percent and said diol residues are based on 100 mole percent.

78. The polyester composition of claim 77 wherein said diol residues comprise about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent ethylene glycol.
79. The polyester composition of claim 78 wherein said plasticizer comprises one or more benzoates, phthalates, phosphates, or isophthalates.
80. The polyester composition of claim 79 wherein said plasticizer comprises diethylene glycol dibenzoate.
81. The polyester composition of claim 80 wherein said flame retardant comprises about 5 to about 40 wt%, based on the total weight of said polyester composition, of one or more monoesters, diesters, or triesters of phosphoric acid.
82. The polyester composition of claim 81 wherein said flame retardant is a plasticizer for said polyester.
83. The polyester composition of claim 82 wherein said flame retardant comprises resorcinol bis(diphenyl phosphate).
84. The polyester composition of claim 83 wherein said polyester composition has a Tg of 30°C or less.
85. A process for a flame retardant film or a sheet, comprising:
  - (i) calendering a polyester composition comprising

- (a) about 50 to about 95 weight percent of a polyester having a melting temperature of less than 220°C and exhibiting more than 1 percent crystallinity after annealing for 2000 minutes at a temperature at which said polyester has a maximum crystallization rate, wherein said polyester is a random copolymer;
- (b) about 5 to about 50 wt% of a plasticizer miscible with said polyester, based on the total weight of said polyester composition; and
- (c) a phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer; and

- (ii) inducing crystallization during step (i) or after step (i).

86. The process of claim 85 wherein said plasticizer comprises one or more aromatic rings.

87. The process of claim 86 wherein said plasticizer comprises about 10 to about 40 wt% of said polyester composition based on the total weight of said polyester composition.

88. The process of claim 87 wherein said plasticizer dissolves a 5-mil (.127 mm) thick film of said polyester to produce a clear solution at a temperature of 160°C or less.

89. The process of claim 88 wherein said plasticizer has a solubility parameter in the range of about 9.5 to about 13.0 cal<sup>0.5</sup>cm<sup>-1.5</sup>.

90. The process of 89 wherein said plasticizer is an ester comprising

- (i) an acid residue comprising one or more of: phthalic acid, adipic acid, trimellitic acid, benzoic acid, azelaic acid, terephthalic acid, isophthalic acid, butyric acid, glutaric acid, citric acid or phosphoric acid; and
- (ii) an alcohol residue comprising one or more of methanol, ethanol, propanol, isopropanol, butanol, isobutanol, stearyl alcohol, lauryl alcohol, phenol,

benzyl alcohol, hydroquinone, catechol, resorcinol, ethylene glycol, neopentyl glycol, 1,4-cyclohexanedimethanol, or diethylene glycol.

91. The process of claim 90 wherein said polyester comprises (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent of one or more diols selected from ethylene glycol, 1,2-propanediol, 1,3-propanediol, propylene glycol, 1,4-butanediol, 1,5-pantanediol, neopentyl glycol, diethylene glycol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pantanediol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, 1,3-cyclohexanedimethanol, bisphenol A, and polyalkylene glycol, wherein said diacid residues are based on 100 mole percent and said diol residues are based on 100 mole percent.
92. The process of claim 91 wherein said diol residues comprise about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent ethylene glycol.
93. The polyester composition of claim 92 wherein said plasticizer comprises one or more benzoates, phthalates, phosphates, or isophthalates.
94. The polyester composition of claim 93 wherein said plasticizer comprises diethylene glycol dibenzoate.
95. The process of claim 94 wherein said flame retardant comprises about 5 to about 40 wt%, based on the total weight of said polyester composition, of one or more monoesters, diesters, or triesters of phosphoric acid.
96. The process of claim 95 wherein said flame retardant is a plasticizer for said polyester.

97. The process of claim 96 wherein said flame retardant comprises resorcinol bis(diphenyl phosphate).
98. The process of claim 97 wherein said polyester composition has a Tg of 30°C or less.
99. The process of claim 98 wherein said polyester composition comprises a molten, pellet or powder form and is passed through a compressive nip between at least two calendering rolls at temperatures of about 100°C to about 200°C.
100. A flame retardant film or sheet, comprising:
  - (a) about 50 to about 95 weight percent of a polyester having a melting temperature of less than 220°C and exhibiting more than 1 percent crystallinity after annealing for 2000 minutes at a temperature at which said polyester has a maximum crystallization rate, wherein said polyester is a random copolymer;
  - (b) about 5 to about 50 weight percent of a plasticizer miscible with said polyester; and
  - (c) a phosphorus-containing flame retardant miscible with said polyester plasticized with said plasticizer.
101. The film or sheet of claim 100 wherein said plasticizer comprises one or more aromatic rings.
102. The film or sheet of claim 101 wherein said plasticizer comprises about 10 to about 40 wt% of said polyester composition based on the total weight of said polyester composition.
103. The film or sheet of claim 102 wherein said plasticizer dissolves a 5-mil (.127 mm) thick film of said polyester to produce a clear solution at a temperature of 160°C or less.

104. The film or sheet of claim 103 wherein said plasticizer has a solubility parameter in the range of about 9.5 to about  $13.0 \text{ cal}^{0.5} \text{ cm}^{-1.5}$ .
105. The film or sheet of 104 wherein said plasticizer is an ester comprising
  - (i) an acid residue comprising one or more of: phthalic acid, adipic acid, trimellitic acid, benzoic acid, azelaic acid, terephthalic acid, isophthalic acid, butyric acid, glutaric acid, citric acid or phosphoric acid; and
  - (ii) an alcohol residue comprising one or more of methanol, ethanol, propanol, isopropanol, butanol, isobutanol, stearyl alcohol, lauryl alcohol, phenol, benzyl alcohol, hydroquinone, catechol, resorcinol, ethylene glycol, neopentyl glycol, 1,4-cyclohexanedimethanol, or diethylene glycol.
106. The film or sheet of claim 105 wherein said polyester comprises (i) at least 80 mole percent of diacid residues comprising one or more of: terephthalic acid, naphthalenedicarboxylic acid, 1,4-cyclohexanedicarboxylic acid, or isophthalic acid; and (ii) diol residues comprising about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent of one or more diols selected from ethylene glycol, 1,2-propanediol, 1,3-propanediol, propylene glycol, 1,4-butanediol, 1,5-pentanediol, neopentyl glycol, diethylene glycol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pantanediol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, 1,3-cyclohexanedimethanol, bisphenol A, and polyalkylene glycol, wherein said diacid residues are based on 100 mole percent and said diol residues are based on 100 mole percent.
107. The film or sheet of claim 106 wherein said diol residues comprise about 10 to about 100 mole percent 1,4-cyclohexanedimethanol and 0 to about 90 mole percent ethylene glycol.
108. The polyester composition of claim 107 wherein said plasticizer comprises one or more benzoates, phthalates, phosphates, or isophthalates.

109. The polyester composition of claim 108 wherein said plasticizer comprises diethylene glycol dibenzoate.
110. The film or sheet of claim 109 wherein said flame retardant comprises about 5 to about 40 wt%, based on the total weight of said polyester composition, of one or more monoesters, diesters, or triesters of phosphoric acid.
111. The film or sheet of claim 110 wherein said flame retardant is a plasticizer for said polyester.
112. The film or sheet of claim 111 wherein said flame retardant comprises resorcinol bis(diphenyl phosphate).
113. The film or sheet of claim 112 wherein said polyester composition has a Tg of 30°C or less.